Executive Summary

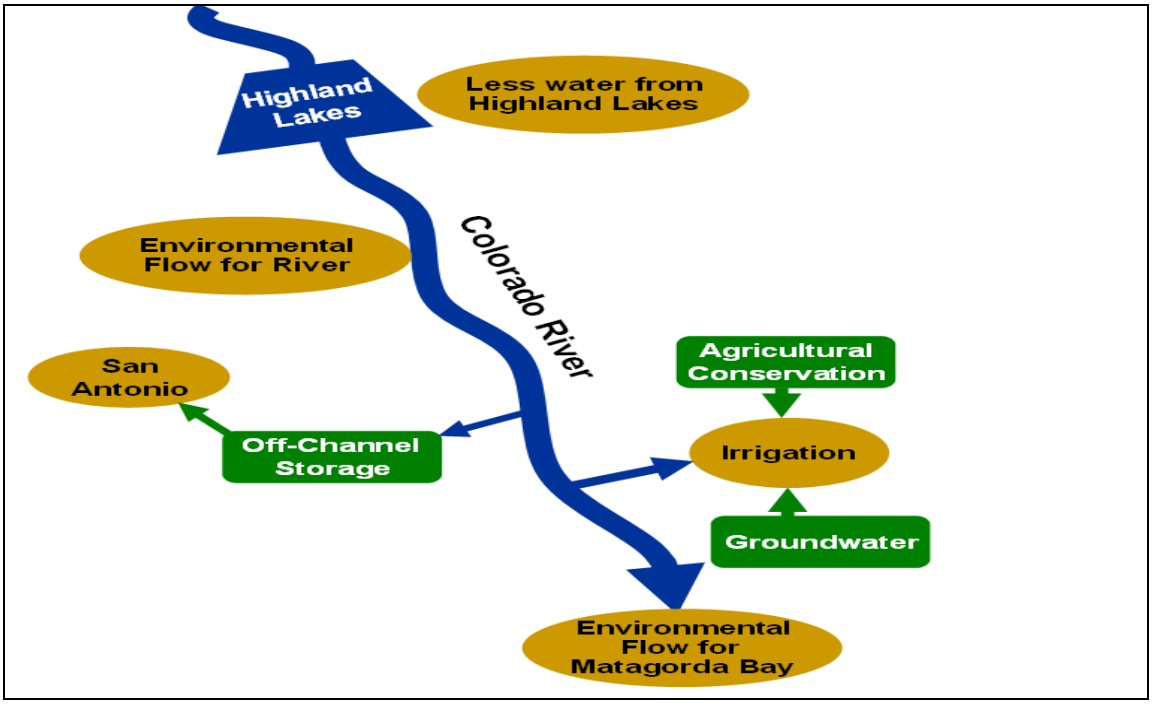
Project Overview

The LCRA-SAWS Water Project would conserve water, develop groundwater, and capture excess and unused river flows to meet future water needs for two neighboring regions in Texas. Agricultural and other rural water needs would be met more reliably in the lower Colorado River basin through water conservation, surface water development, and limited groundwater production, while up to 150,000 acre-feet per year of surface water would be transferred to the San Antonio area. Groundwater would not be transferred to San Antonio as part of the project. A project overview schematic is shown in Figure ES-1.

The project would conserve and develop water in three ways:

- Reduce agricultural irrigation water demand through conservation practices and measures
- Capture and store excess and unused river flows
- Use limited amounts of groundwater for agriculture when surface water is not available

FIGURE ES-1
Project Overview
LCRA-SAWS Water Project



The green boxes represent the sources of water for the project. The gold ovals represent how the water will be used.

The integrated approach to water management – using conservation, river flows, Highland Lakes and groundwater as a single system – increases efficiency. In 2007, the Lower Colorado River Authority (LCRA) and San Antonio Water System (SAWS) completed the fourth year of detailed technical studies of this collaborative project that provides a model for interbasin projects that are environmentally sustainable and protective of both rural and urban economies. It is anticipated that permit applications will be submitted during late 2009.

Project Components

The project includes the following components:

- Implementing additional water conservation measures for rice farmers in Colorado, Wharton, and Matagorda counties would lower irrigation demand. Approximately 118,000 acre-feet of water per year could be conserved through irrigation water delivery system improvements and on-farm water saving measures, including development of a new high-yielding rice variety.
- Using groundwater for agriculture when river water is not available would increase reliability of irrigation water used in the lower Colorado River basin. The agreement between LCRA and SAWS limits groundwater use for agriculture to a maximum annual average of 36,000 acre-feet of groundwater during the term of the agreement (when the project is implemented); a maximum rolling 10-year average of 62,000 acre-feet per year; and a maximum annual usage equal to or less than 95,000 acre-feet. Groundwater production would also be regulated by local groundwater conservation districts.
- Ensuring that adequate amounts of water flow in the Colorado River and into Matagorda Bay would address environmental objectives as required by the enabling legislation. Environmental water needs are considered in light of growing populations in the lower Colorado River basin and the San Antonio area.
- Building off-channel storage in the lower Colorado River basin would allow up to 150,000 acre-feet of river water per year to be available for transfer to the San Antonio area.

A fifth component of the project is the water transmission and treatment system that will pipe the river water from the LCRA delivery point at the Wharton County line to the San Antonio area and treat it to drinking water standards. This portion of the overall project is being studied, developed, and managed by SAWS.

In combination, the project components allow Highland Lake levels to be higher on average than they would be without the project.

Key Challenges

In addition to the state and federal permits required for this type of project, specific legislative criteria (Texas Special District Local Laws Code, § 8503.030; also referred to as House Bill 1629, 77th Legislature) must be met before any water is transferred from the Colorado River basin. The law requires findings that the following objectives are met:

- Protect and benefit the lower Colorado River watershed and the LCRA's service area, including municipal, industrial, agricultural, recreational, and environmental interests

- Be consistent with regional water plans filed with the Texas Water Development Board (TWDB) on or before January 5, 2001
- Ensure that beneficial inflows remaining after any water diversions will be adequate to maintain the ecological health and productivity of the Matagorda Bay system
- Provide for instream flows no less protective than those included in the LCRA Water Management Plan for the lower Colorado River basin, as approved by the Texas Commission on Environmental Quality (TCEQ)
- Ensure that, before any water is delivered by the project, SAWS has prepared a drought contingency plan and has developed and implemented a water conservation plan that will result in the highest practicable levels of water conservation and efficiency achievable within the jurisdiction of the municipality (SAWS)
- Provide for a broad public and scientific review process designed to ensure that all information that can be practicably developed is considered in establishing beneficial inflow and in-stream flow provisions
- Benefit stored water levels in LCRA's existing reservoirs

The agreement between LCRA and SAWS provides the fundamental framework for shared risk on the project. The division of risk is characterized by the following conditions:

- During the project study period, either LCRA or SAWS may withdraw from the project under varying conditions. SAWS is funding the project based on the terms and conditions in the agreement with LCRA. If the project is not implemented, then the costs incurred to date will be evenly divided between the two entities.
- At the conclusion of the study period, if SAWS approves the LCRA-developed implementation plan outlining in detail the project's cost and water yield, then LCRA is obligated to deliver the agreed amount of water supplied to SAWS according to, and for the term of, the contract.

PVA Summary of Results

The 2007 Project Viability Assessment (PVA) represents the current view of the project's feasibility based on results of various yield, engineering, environmental, and cost analyses through 2007. The studies are designed to address: the seven LCRA Board findings required for the project to be implemented; local, state and federal permitting requirements; issues raised by stakeholders, other members of the public, and the project's science review panel; and technical feasibility.

Following are the key findings and conclusions of the studies to date:

General Findings:

- While the analyses are not complete, indications are that the project can supply a reliable, firm water supply for SAWS and meet the legislative criteria; however, the studies are based on assumptions. As assumptions are refined, the results of the analyses could change and may affect costs or yield of the project.
- A variety of scenarios are being explored that could supply between 50,000 and 150,000 acre-feet per year of surface water to SAWS. The 2007 PVA provides results for example

scenarios of 95,000 and 120,000 acre-feet per year for comparison. The final yield of the project has not been determined.

- The project would provide more reliable water sources for agricultural users served by LCRA in Colorado, Wharton, and Matagorda counties in all the scenarios studied.
- During 2007, Pierce Ranch in Wharton County was selected as the preferred location for the off-channel storage facility after consideration of various sites. Selection of the off-channel storage location represents a pivotal decision for the project; the site will be studied further. Several of the studies hinged on data related to facility locations; thus, the overall study schedule was extended to allow sufficient time for making this decision.
- Some additional technical work is proposed for the study period based on comments and suggestions received during the public involvement and the project's science review panel processes that may affect the overall cost of the studies.

Specific Findings:

- Model simulations for groundwater and river water availability indicate that the **yield from conjunctive use of those sources plus agricultural conservation will be sufficient** to meet agricultural needs within the lower Colorado River basin more reliably while still providing a firm supply of water for the San Antonio area. Operating the LCRA system to meet the lower Colorado River basin demands, project yield, lake levels, and environmental flow needs will be challenging; additional modeling will be performed to refine options.
- For purposes of this PVA, a scenario of surface water availability modeling was conducted providing a firm yield to SAWS of 95,000 acre-feet per year using specific assumptions as discussed in more detail in Section 4 of this PVA. With this set of assumptions, LCRA irrigation demands with the project in operation would be fully satisfied with a combination of surface water, groundwater and agricultural conservation. The proposed yield of the project has not yet been determined.
- A second scenario for 2080 conditions also was performed with the firm supply of surface water delivered to SAWS set equal to 120,000 acre-feet per year. As a result, the available supplies for the LCRA irrigation operations with the project implemented were curtailed by an average of 7.5 percent over the entire period of record (1940-1998) and 20.3 percent during the drought-of-record period (1947-1957). These available supplies for agriculture with the project compare to curtailments without the project of 23.7 percent over the period of record and 54.6 percent during the drought-of-record.
- Analysis of the irrigation delivery systems and on-farm conservation strategies continue to indicate that irrigation demand will be reduced sufficiently so that, with conjunctive use of groundwater, **water supplies for agriculture will be more reliable with the project** than without.
- Preliminary results indicate that an average of 106,000 acre-feet of irrigation water can be conserved during average conditions and approximately 123,000 during peak demand (dry) periods. Technical and economic analyses suggest that additional demand reductions are feasible and economically efficient for irrigators to implement**. Reducing irrigation water demand through these methods appears feasible; pilot testing could help verify actual water savings compared to projections.**

- In keeping with the legislation that allows LCRA to consider this project, the **average lake levels are projected to be higher over the life of the project compared to corresponding future conditions without the project.** Further evaluation of this issue will continue and an implementation plan consistent with the legislative requirements will be developed.
- Current groundwater production simulations (approximately 25,000 acre-feet per year during the period of record and 62,000 acre-feet per year during drought of record conditions) indicate that the average net, or incremental, water level drawdown at the end of the year during the period studied could range from less than one foot up to approximately 14 feet within the irrigation divisions. Average drawdowns outside the divisions are less than those expected within the irrigation divisions. Because pumping would vary over the life of the project, with virtually no pumping expected in some years, water level drawdowns are also expected to be temporary. Modeling of the aquifer indicates a short "recovery" period during which water levels rebound quickly after pumping is reduced. These estimated drawdown estimates should be considered preliminary, but suggest that the **use of groundwater to help meet agricultural needs is feasible with minimal long-term effects on nearby wells.**
- The facility siting identification and evaluation process conducted in 2007 explored numerous conceptual project alternatives and confirmed that potential locations for proposed project components such as intake structures, pipelines, and off-channel storage facilities (constructed holding basins for surface water) exist. **A preferred location for the off-channel storage facility was selected; field data collection began in 2007**.
- The results of the environmental studies (water quality, river habitat, and bay health) are not yet complete, but have not revealed any effects to date that would preclude the project from being implemented.
- The river water quality modeling to date indicates that **dissolved oxygen will be within acceptable ranges after anticipated changes to the flow regime** associated with the project. Additional preliminary water quality modeling of other constituents (for example, nutrients) during 2007 also indicated **water quality will be within acceptable ranges.**
- The aquatic habitat studies have documented additional information on the blue sucker and other species including migration habits during spawning season and specific habitat preferences. This information will be useful for developing site plans and operating procedures sensitive to these species**.** Habitat models of the river were developed in prior years and utilized to develop segment specific stream flow criteria. **Surface water availability modeling was conducted during 2007 using the proposed instream flow criteria resulting from these studies**.
- Building on the efforts of previous years, significant strides were made during 2007 in developing measures to benchmark bay health and productivity. The **approach to this study looks at bay health from several perspectives (inflow, habitat, and biology) and seeks to link freshwater inflow changes to habitat changes that could affect the biological systems or productivity of the bay**. Using these benchmarks, the team has proposed freshwater inflow criteria to develop proposed operational and permitting

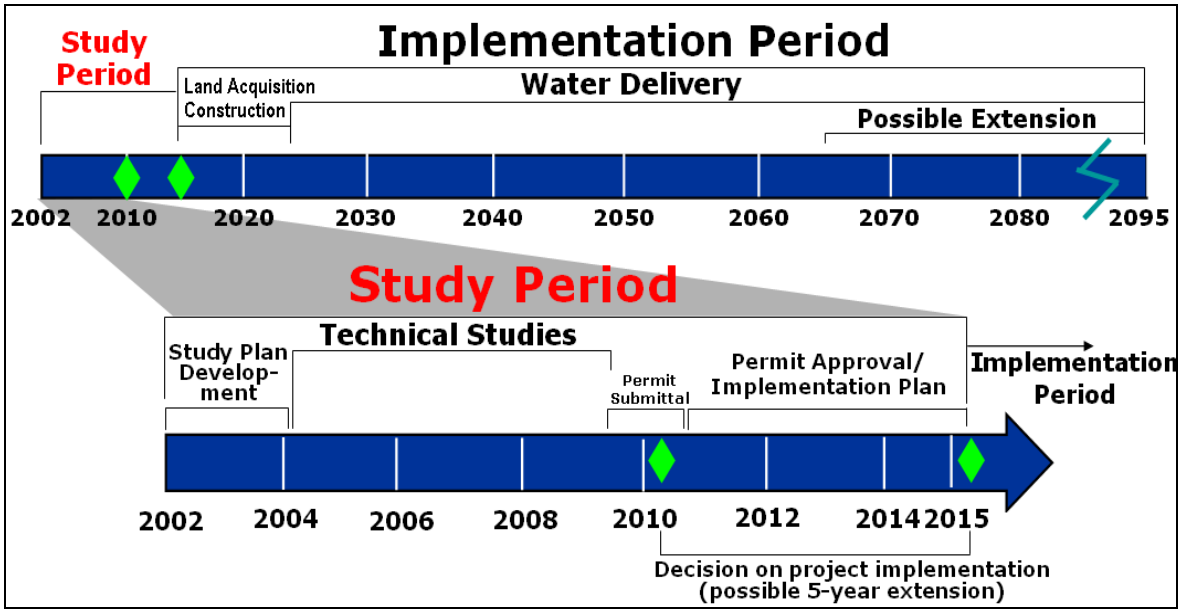
approaches. These are currently being discussed and reviewed by state resource agencies and stakeholders.

- The study **activities planned for 2008 will support submittal of permit applications in late 2009**, as well as address key feasibility, legislative and contractual requirements.

Schedule

The fourth year of technical studies was completed in 2007. An overview of the project schedule is provided in Figure ES-2. The top line indicates the overall duration of the project, according to the agreement between LCRA and SAWS. The bottom line shows more detail regarding the project's study period, initially scheduled to be completed by 2010. The green diamonds indicate a possible extension of the study period in both the overall and detailed schedule overview.

FIGURE ES-2
Schedule Overview
LCRA-SAWS Water Project



Cost

Using the state's regional planning cost methodology (annualized cost model) and second quarter 2007 prices, the current project cost estimates to deliver treated water to the SAWS system range from $1,957 to $1,876 per acre-foot per year, for 95,000 and 120,000 acre-feet, respectively. When the estimated costs of integrating the water into SAWS distribution system are included, the annual costs are projected to range from $2,253 to $2,161 per acre-foot per year.

The project cost estimates in the 2007 PVA are higher than those included in the 2006 PVA. The 2007 costs were updated to include the following, more current information:

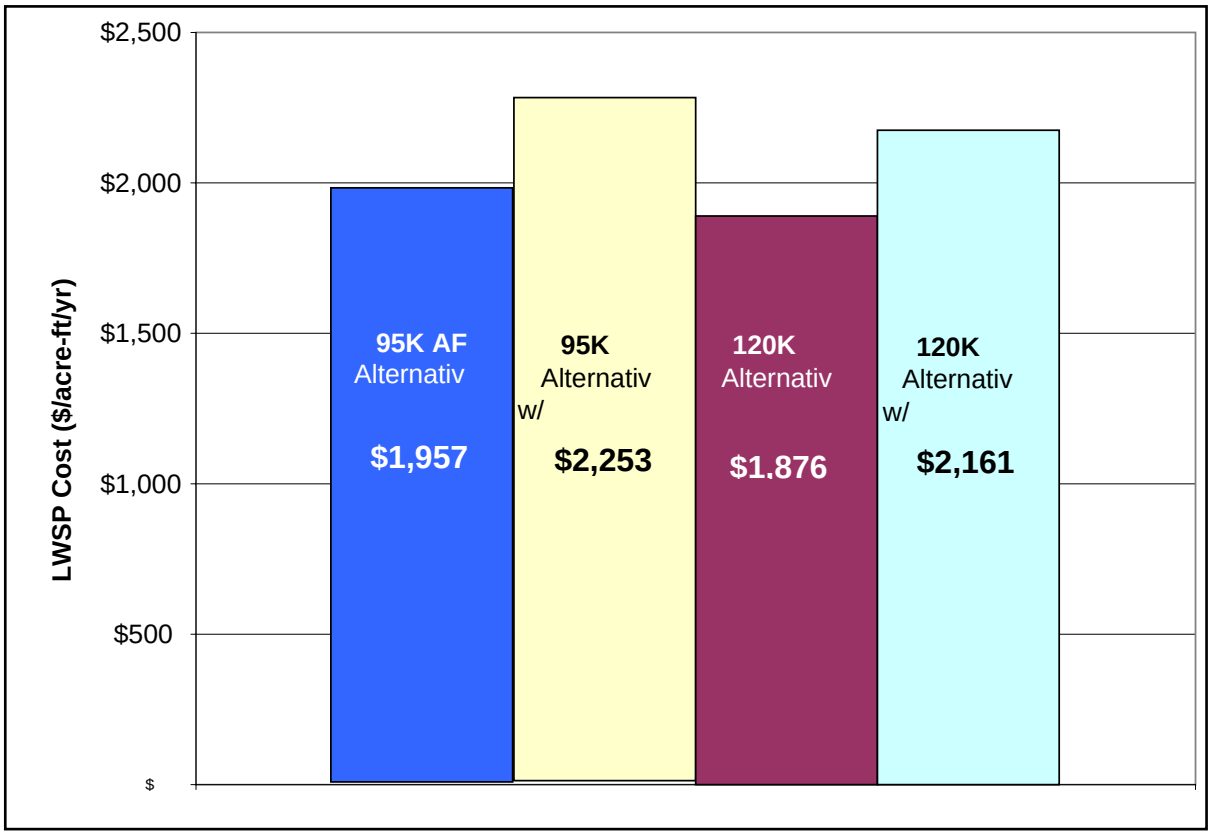
- Costs are presented for two yields (95,000 and 120,000 acre-feet per year of water) delivered at a constant rate to SAWS using the annualized cost method. A description of

this methodology is outlined in Section 10 of the PVA. Costs represent total costs of all facilities that will be constructed by both SAWS and LCRA, including the costs of integrating treated water into selected SAWS' existing pump stations.

- The selection of the storage facility site in Wharton County.
- Increased diversion capacity from 1,800 cubic feet per second (cfs) to 2,500 cfs and 6,000 cfs (for 95,000 and 120,000 acre-feet per year delivered to SAWS, respectively) for delivery of raw water diverted from the Colorado River to off-channel storage.
- Engineering estimates for various components such as size and depth of off-channel storage facilities, pipeline lengths and diameters, and treatment capacity based on these capacities.
- More specific cost estimates for transmission, terminal storage, and treatment for delivery of finished (treated) water to SAWS' distribution system.
- Additional detailed cost estimates for agricultural water conservation strategies in LCRA irrigation divisions, specifically the addition of "on-farm" agricultural conservation strategies.
- Optimization of the groundwater well system in Colorado, Wharton and Matagorda counties resulted in an increased estimate of the number of wells from 105 to 133. Such a system would provide redundancy and the capacity to shift production to minimize potential effects to nearby existing wells, if necessary. It also would allow sufficient groundwater pumping during a three-month rather than a six-month period for agriculture during the irrigation season. For cost estimating, it was assumed that all the wells would be new wells, although some wells used for the project could be leased existing wells.
- More refined costs derived from estimates taken from commercial heavy construction costing software, existing bid information, and professional knowledge of local markets from the various study teams, compiled into a single project cost estimate.
- Construction estimates based on second quarter 2007 costs compared to 2004 construction values.
- Rural land costs using current data from the Texas A&M Real Estate Center.
- Increased energy costs from $0.06 per kilowatt hour (kWh) to $0.08/kWh, reflecting the trend of increasing power costs.

Figure ES-3 provides a summary of current estimated costs per acre-foot for the project using the annualized cost method.

FIGURE ES-3
Cost Estimate for Delivery of Treated Water to SAWS Distribution System (per acre-foot), Annualized Cost Method
LCRA-SAWS Water Project



Costs presented in Figure ES-3 are for representative scenarios with yields of 95,000 and 120,000 acre-feet per year delivery water to the San Antonio area from an off-channel storage site in Wharton County. Rigorous engineering optimization has not been performed in preparing these estimates. It is possible that costs could be lowered upon further study and future engineering design and optimization efforts. Similarly, costs could increase due to the risk factors discussed in Section 10 of this PVA.